



SMART -
Concept Exploration Phase
Challenges and Opportunities

Army Model and Simulation Office
Presentation at Industry Days
2 June 1999
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Director, Army Model and Simulation Office



Current AMSO Priorities

1. Devise a cost effective **evolution plan for each M&S domain**- develop and maintain a smaller, more robust set of M&S (JWARS, JSIMS/WARSIM, JMASS, AWARS, Combat XXI, CCTT, OneSAF)
2. Evolve M&S domains towards the **integrated use** of **Simulations and Models across the areas of Acquisition, Requirements, and Training (SMART)**
3. Promote commonality, re-use, credibility and interoperability through **M&S Standards**
4. Tackle immediate challenges such as **C4I to M&S interfaces**, **synthetic terrain**, threat representations, and chem/bio M&S
5. Develop a **M&S Science and Technology** program to facilitate the Army After Next (i.e. automated decision making)



Army Model & Simulation Office (AMS0)

Mission Statement

In support of the Army - its mission and soldiers - the Army Model and Simulation Office (AMS0) **provides the vision, strategy, oversight, and management of Models and Simulations (M&S)** across all M&S domains.

Core Competencies

- 1) **Develops and promulgates** the Army's M&S **policy**;
- 2) ensures the **integration of M&S** across all three of the Army's M&S domains - -
 - Advanced Concepts and Requirements (ACR);
 - **Research, Development, and Acquisition (RDA); and**
 - Training, Exercises and Military Operations (TEMO);
- 3) assists senior leaders in properly resourcing Army M&S programs;
- 4) **fosters reuse and development of common M&S components and tools;**
- 5) acts as **focal point** for Army M&S matters with the Joint Staff, CINC's, DARPA, DMSO, Services, DoD Agencies and OSD staff elements; and
- 6) promotes the Army's M&S **research program**.



Domains of Mission Activity in Which M&S Are Applied

Advanced Concepts & Requirements

Activities

- Force Design
- Force Development
- Operational Requirements
- Warfighting Experiments

Simulations / Simulators

- Reconfigurable Simulators
- Constructive Models

Training, Exercises, & Military Operations

Activities

- Individual & Collective Trng
- Joint / Combined Exercises
- Mission Rehearsal
- Operational Planning

Simulations / Simulators

- System Simulators
- Training Simulations

Research, Development, & Acquisition

Activities

- Basic/Applied Research
- Weapon System Development
- Materiel Acquisition
- Test and Evaluation

Simulations / Simulators

- System Prototypes,
- Engineering / Physical Models

AMSO



Domains of Mission Activity in Which M&S Are Applied

Advanced Concepts & Requirements

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- Force Development
- Operational Requirements ✓
- Warfighting Experiments ✓

Simulations / Simulators

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Simulations / Simulators

- ✓ - System Simulators
- ✓ - Training Simulations

Research, Development, & Acquisition

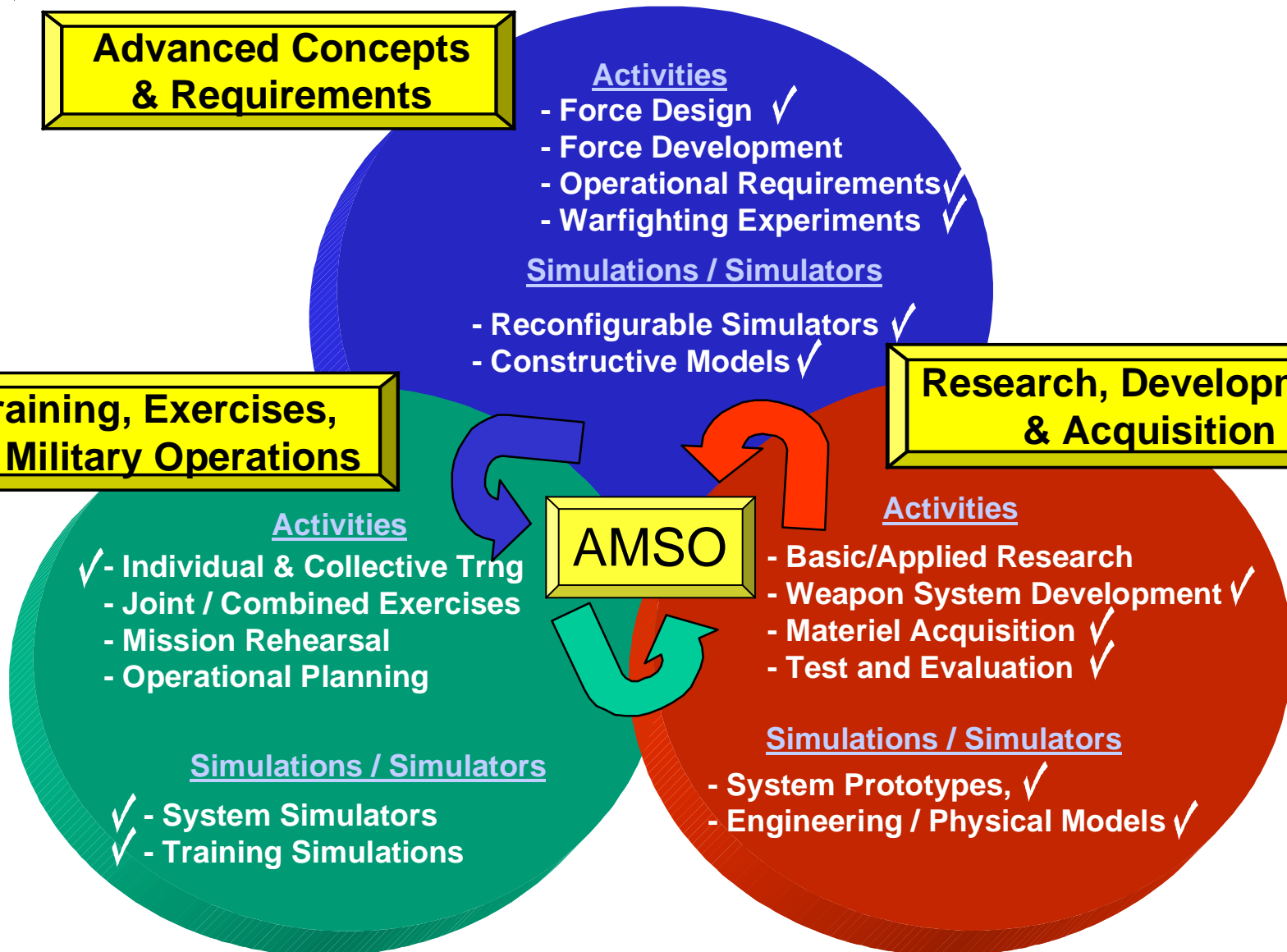
Activities

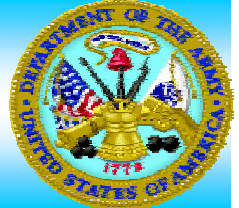
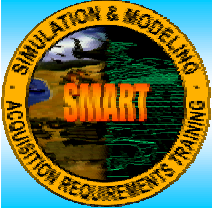
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Simulations / Simulators

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Strategic Evolution Plan

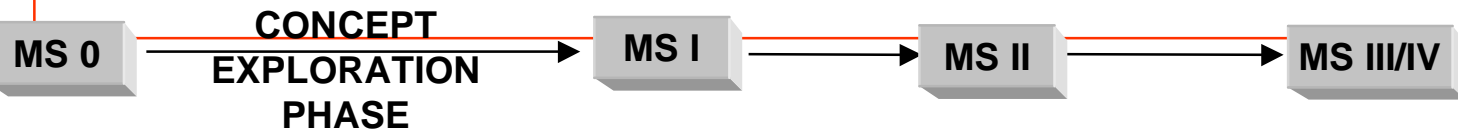
Purpose: Identify actions and activities across RDA M&S Domain to execute SMART

Objectives:

1. M&S Tools - identify, **develop, mature tools** to support acquisition functional analysis and assessment
2. M&S Technologies - identify, develop, mature technologies to support **distributed collaboration**, faster than real time, and hyper real time processing, **information interfacing**, simulation based learning, embedded training, embedded Course of Action Analysis, others
3. **M&S Standards** - identify, develop, mature standards for ensuring M&S tool interoperability (“plug and play”), seamless data transfer, reuse
4. M&S Strategies - identify, develop, mature strategies for capitalizing on M&S to enable integration of acquisition, requirements, training
5. M&S Guidance/**Policy** - develop guidance/policy that enables and incentivizes acquisition workforce in executing SMART



Simulation & Modeling for Acquisition, Requirements, and Training



Challenge/Opportunity = Balance Combat Effectiveness w/Total Ownership Cost

Combat Developer

Matériel Developer

Weapon System Development

USER

PM

**OPERATIONAL
CONCEPT &
REQUIREMENTS:**

- KEY PERFORMANCE PARAMETERS
- MISSION PROFILE
- MANNING REQUIREMENTS
 - Grade, Skills, and Number
- TRAINING STRATEGY
- LOG SUPPORT PLAN

- COST
- PERFORMANCE
- SCHEDULE



TRAINING STRATEGY

(SPECIALIZED, INTEGRATED, OR EMBEDDED)

- DRIVER
- CREW
- GUNNER

LOGISTICS SUPPORT PLAN

- MAINTENANCE ALLOCATION
- CL IX STOCKAGE
- CL III, V AND TRANSPORTABILITY CONSIDERATIONS
- CONTRACTORS ON THE BATTLEFIELD ?

MODERNIZATION STRATEGY

- PRE-PRODUCT IMPROVEMENT
- MOD THRU SPARES
- BLOCK IMPROVEMENTS

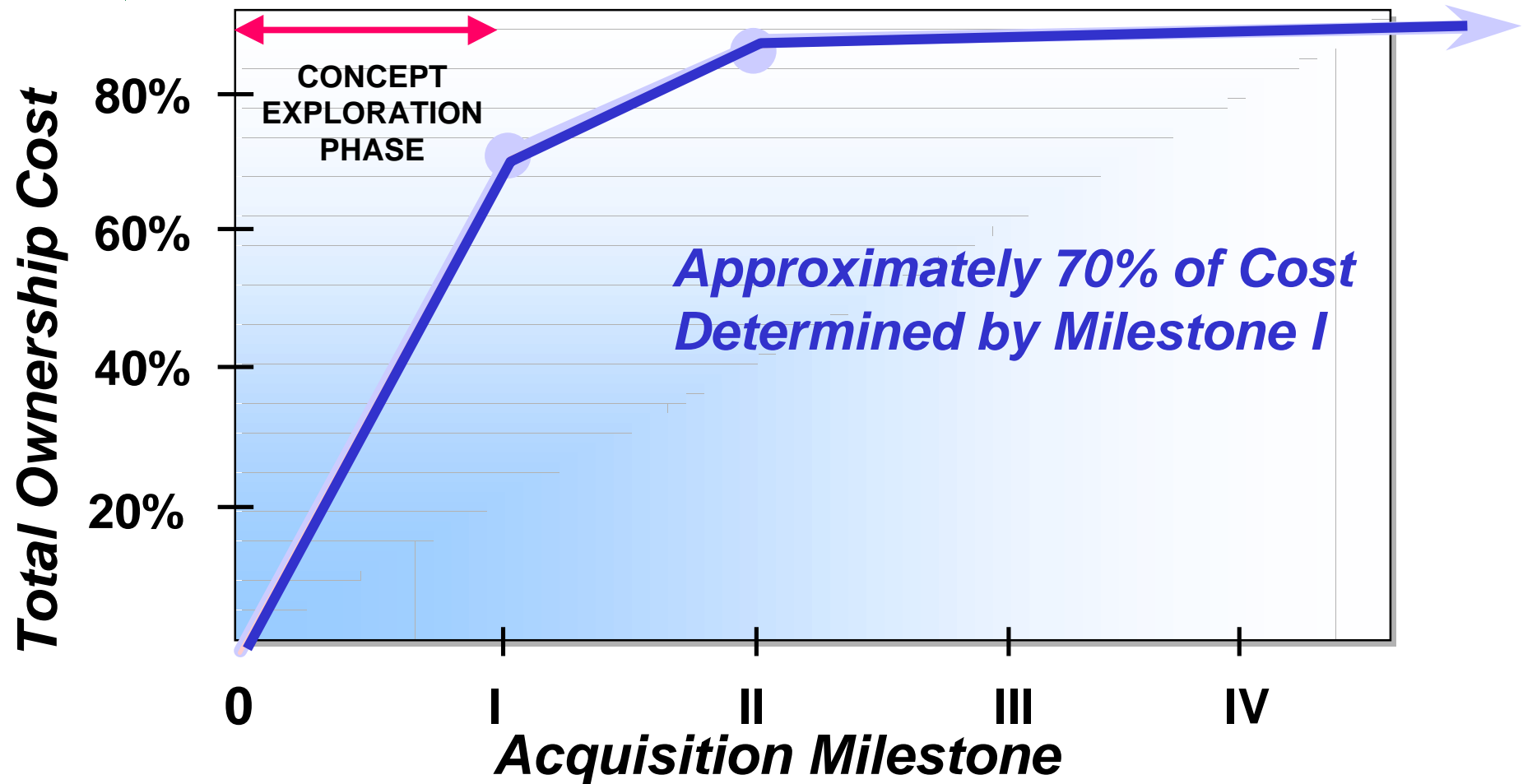
LIFE CYCLE COST DISTRIBUTION:

- ACQUISITION 28%
- OPERATIONS 12% (67% Personnel)
- LOG SUPPORT 60%

SOURCE: DUSD(L)



Challenge & Opportunity



Up Front and Continuous Attention Needed on Ownership Costs



Simulation & Modeling for Acquisition, Requirements, and Training

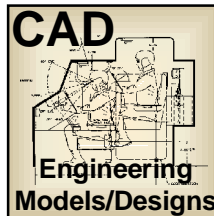


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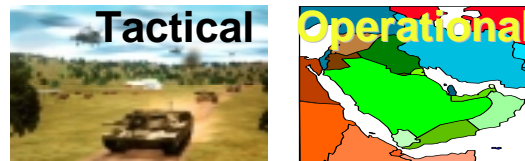
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**OPERATIONAL
CONCEPT &
REQUIREMENTS:**

- MISSION PROFILE
- MANNING
- TRAINING STRAT
- LOG SUPPORT PLAN



CONSTRUCTIVE SIMULATIONS



TRAINING STRATEGY
(SPECIALIZED, INTEGRATED, OR IMBEDDED)

- DRIVER
- CREW
- GUNNER

LOGISTICS SUPPORT PLAN

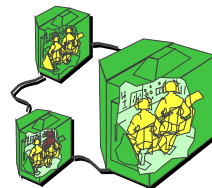
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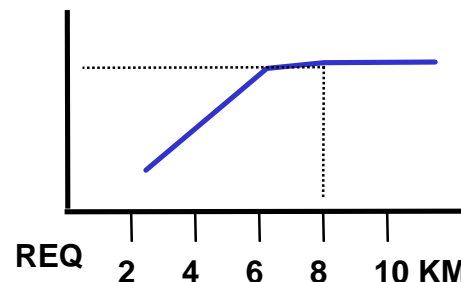
**ANALYSIS OF
ALTERNATIVES**

VIRTUAL SIMULATORS



**MANPRINT
FIGHTABILITY**

**Combat
Effectiveness**





Simulation & Modeling for Acquisition, Requirements, and Training

MS 0

CONCEPT
EXPLORATION
PHASE

MS I

MS II

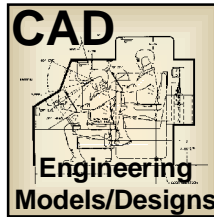
MS III/IV

USER

Challenge/Opportunity = Balance Combat Effectiveness w/Total Ownership Cost

OPERATIONAL
CONCEPT &
REQUIREMENTS:

- MISSION PROFILE
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- LOG SUPPORT PLAN



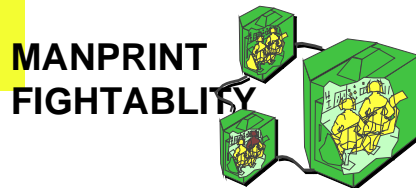
COST ESTIMATES:
• R&D
• RAM/LOG



CONSTRUCTIVE SIMULATIONS



VIRTUAL SIMULATORS



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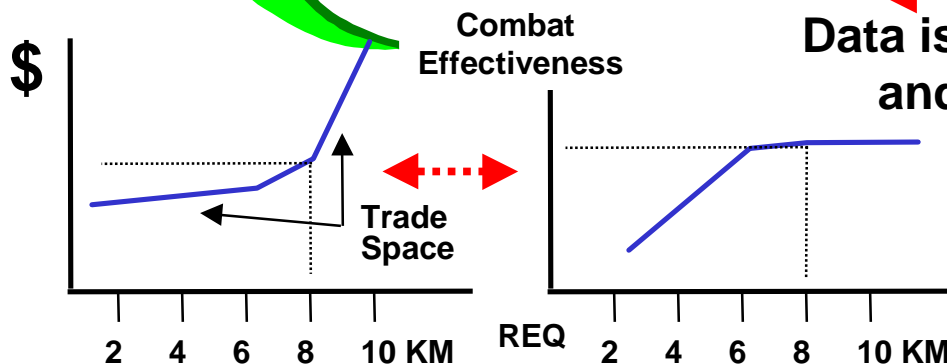
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- CREW
- GUNNER

LOGISTICS SUPPORT PLAN

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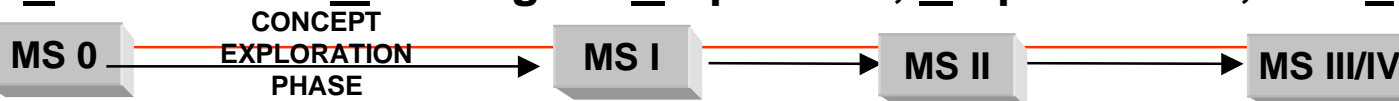
- MODERNIZATION STRATEGY
- PRE-PRODUCT IMPROVEMENT
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 - BLOCK IMPROVEMENTS

ANALYSIS OF
ALTERNATIVES
10s of
POSSIBILITIES





Simulation & Modeling for Acquisition, Requirements, and Training

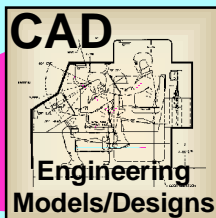


USER

Challenge/Opportunity = Balance Combat Effectiveness w/Total Ownership Cost

**OPERATIONAL
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REQUIREMENTS:**

- MISSION PROFILE
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COST ESTIMATES:

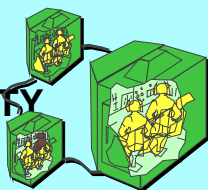
- R&D
- RAM/LOG
- PHYSICS of FAILURE

CONSTRUCTIVE SIMULATIONS



VIRTUAL SIMULATORS

MANPRINT
FIGHTABILITY



TRAINING STRATEGY

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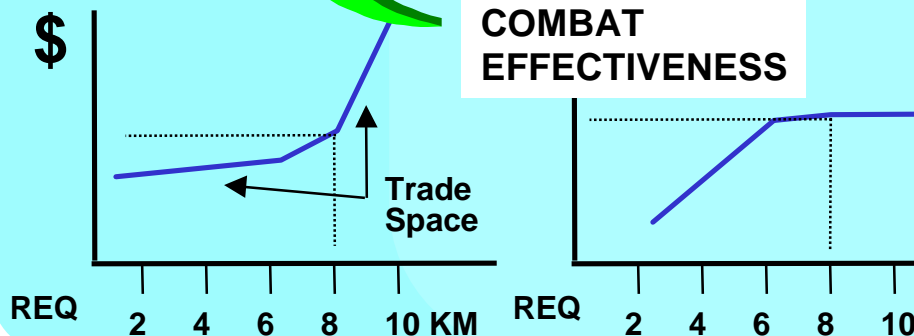
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**ANALYSIS OF
ALTERNATIVES**
1000s of
POSSIBILITIES

M&S ENABLERS:

- COLLABORATIVE ENVIRONMENT
- STANDARDS: DATA THREAT TERRAIN C4I INTERFACES MSRR
- POLICY
- HYPERFAST M&S
- COMPOSABLE BEHAVIORS

**COMBAT
EFFECTIVENESS**





Evolution of Standards Process

PHASE 1

- 19 Standard Categories established
- System and Infrastructure on line - **SNAP & ASTARS**
- Process has started
 - ✓ 16 Approved standards; 91 Draft standards

PHASE 2

- ***“PM Outreach”***: Identify M&S cost drivers
- Focus efforts on high payoff standards
 - ⇒ fewer high payoff standards initially
- Integrated support - Training and Equipping Funds
- Direct funding for SCCs working on high payoff standards

SNAP: STANDARDS NOMINATION & APPROVAL PROCESS
ASTARS: ARMY STANDARDS REPOSITORY SYSTEM



Status of M&S Standards Approval

M&S AREAS:

SEMI AUTOMATED FORCES (0/0/4)
DEPLOYMENT (2/0/2)
LOGISTICS (0/3/26)
MOBILIZATION (0/2/2)
COST REPRESENTATION(2/0/0)

M&S Support:

ARCHITECTURE (4/0/1)
C4I INTEGRATION (0/0/2)
FDB (0/0/2)
DATA (0/0/10)
VV&A (1/0/1)
OBJECT MANAGEMENT (1/1/6)
VISUALIZATION (0/0/0)

M&S Functional Elements:

ACQUIRE (1/0/4)
ATTRITION (0/5/4)
DYNAMIC ENVIRONMENT (3/0/2)
CMD DECISION MODELING (0/2/3)
COMMUNICATIONS SYSTEMS (1/0/1)
MOVE (1/0/6)
TERRAIN (0/1/1)

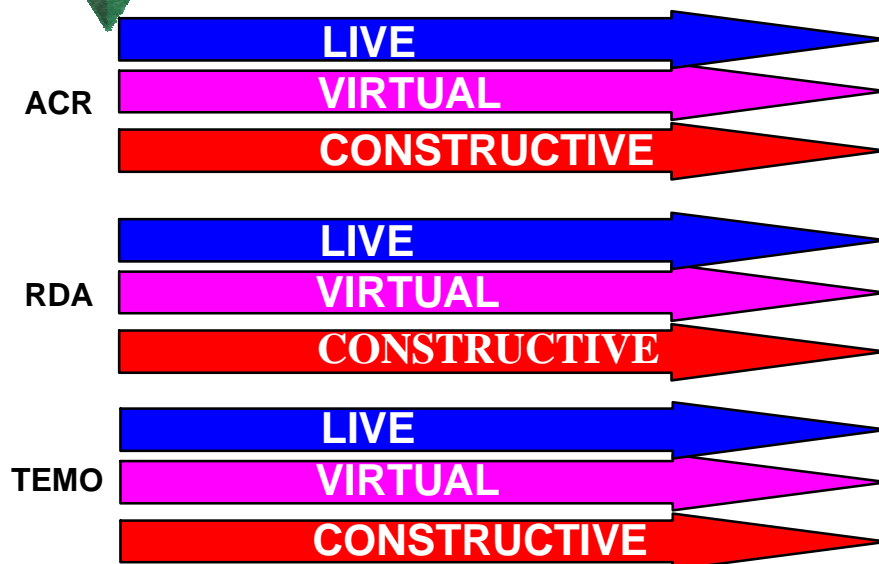
STANDARDS OBJECTIVES:

INTEROPERABILITY, COMMONALITY
RE-USE, CREDIBILITY

(#APPROVED / #IN VOTING / #DRAFT)
(TOTAL: 16/14/77)



We are getting better



Domain Evolution Plans:

Develop & Maintain
a Smaller set of
More Robust and
Interoperable Simulations

-
- Defense Information Infrastructure Common Operating Environment (DII COE)
 - Joint Technical Architecture (JTA)
 - HLA
 - SEDRIS
 - Army M&S Standards
 - C4I-M&S Interfaces
 - SBA/SMART
 - M&S Online Resource Repository
 - AMSO - HQDA Cross-domain M&S Management
 - DCSOPS Executive Agent for M&S Resource Prioritization
 - DUSA(OR) Executive Agent for M&S Policy
 - Terrain Summits
 - Simulation Support Plans
 - SMART Conferences
 - SMART Flagship programs
 - Crusader
 - CCTT
 - FSCS
 - Apache Longbow
 - Commanche



Web Sites Hosted by AMSO

www.amso.army.mil



The Army Model & Simulation Office (AMSO) is the focal point for Army M&S matters. AMSO supports the Army's mission and soldiers by providing the vision, strategy, oversight, & management of M&S across all M&S domains (TEMO, ACR, and RDA).

www.msrr.army.mil/snap



Standards Nomination & Approval Process (SNAP) is a web-based tool used to track, discuss, & vote on standards nominations from the M&S Community.

www.msrr.army.mil/astars



The Army Standards Repository (ASTARS) is an electronic document storage application for Army standards documents.



The Army portion of the Model & Simulation Resource Repository (ArmyMSRR) is used as a guide & directory to Internet info in support of the Army M&S domains (TEMO, ACR, and RDA).

www.msrr.army.mil



The Quadripartite Working Group on Army Operational Research (QWG AOR) web site provides operational research info & technical assistance to the ABCA Armies, TEAL, WSO, PSO & other QWGs to achieve agreed levels of standardization.

www.odusa-or.army.mil/qwg-aor/